

**Final  
Site-Specific Field Sampling Plan,  
Site-Specific Safety and Health Plan, and  
Site-Specific Unexploded Ordnance Safety Plan Attachments  
Artillery and Mortar Impact Areas South of Bains Gap Road,  
Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X**

**Fort McClellan  
Calhoun County, Alabama**

**Task Order CK10  
Contract No. DACA21-96-D-0018  
IT Project No. 796887**

**January 2001**

**Revision 1**

**Final  
Site-Specific Field Sampling Plan Attachment  
Site Investigation at Artillery and Mortar Impact Areas South  
of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X,  
and 142Q-X**

**Fort McClellan  
Calhoun County, Alabama**

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## ***List of Acronyms***

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See Attachment 1 for the list of Abbreviations and Acronyms.

## ***Executive Summary***

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In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation (IT) will conduct site investigation activities at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X, at Fort McClellan, Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals at these sites. The purpose of this site-specific field sampling plan is to provide technical guidance for sampling activities at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X.

The Artillery and Mortar Impact Areas South of Bains Gap Road that comprise this study area include the following:

- Parcel 138Q-X, Impact Area
- Parcel 139Q-X, Impact Area
- Parcel 140Q-X, Impact Area
- Parcel 141Q-X, Impact Area
- Parcel 142Q-X, Impact Area.

Specifically, IT will collect 14 surface soil samples, 14 subsurface soil samples, 2 seep water samples, 12 surface water samples, and 12 sediment samples at these sites. Potential contaminant sources at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X are lead and nitroexplosives. Chemical analyses of the samples collected during the field program will include nitroexplosives, metals, and perchlorate. In addition, sediment samples will be analyzed for total organic carbon and grain size. Results from these analyses will be compared with site-specific screening levels presented in the IT July 2000 *Final Human Health and Ecological Screening Values and PAH Background Summary Report* and regulatory agency guidelines.

The Artillery and Mortar Impacts Areas South of Bains Gap Road, Parcel 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X fall within the “Possible Artillery Impact Areas” shown on Plate 10 of the U.S. Army Corps of Engineers July 1999 *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama*; therefore, unexploded ordnance (UXO) surface sweeps and downhole surveys of soil borings will be required to support field activities at these two ranges. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance.

This site-specific field sampling plan attachment to the installation-wide sampling and analysis plan (SAP) for the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X will be used in conjunction with the site-specific safety and health plan, the site-specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management plan, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan and the site-specific UXO safety plan.



## **1.0 Project Description**

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### **1.1 Introduction**

The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X, under Task Order CK10, Contract Number DACA21-96-D-0018.

This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) (IT, 2000a) for FTMC has been prepared to provide technical guidance for sample collection and analysis at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) and the site-specific unexploded ordnance (UXO) safety plan developed for the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X and the installation-wide work plan (WP) (IT, 1998) and SAP. The SAP includes the installation-wide safety and health plan (SHP), waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP and the site-specific UXO safety plan.

### **1.2 Site Description**

The Artillery and Mortar Impact Areas South of Bains Gap Road that comprise this study area are located in central-eastern part of the Main Post and include the following sites (Figure 1-1):

- Parcel 138Q-X, Impact Area
- Parcel 139Q-X, Impact Area
- Parcel 140Q-X, Impact Area
- Parcel 141Q-X, Impact Area
- Parcel 142Q-X, Impact Area.

These impact areas are located south of Bains Gap Road and southeast of the Former Mortar Range, Parcel 109Q-X in the vicinity of Range 21, (Parcel 77Q), and Range 22, (Parcel 78Q), (Figure 1-2). The impact areas are observed on the 1949, 1954, and 1961 aerial photograph composites. Mortars are presumed to be the ordnance fired into these impact areas because all

other ranges in this vicinity are reported to be exclusively small arms ranges since the 1940s (Environmental Science and Engineering, Inc. [ESE], 1998). Shallow depressions, probable impact craters, are found throughout each of the parcels.

According to the archive search report (ASR), these impact areas fall close to the center of the area marked “Possible Artillery Impact Areas” shown on Plate 3 of the FTMC ASR maps (USACE, 1999a). Maps from World War I and immediately after the Armistice do not show firing points, firing lines, or artillery and mortar ranges that impacted these areas (USACE, 1999a). From photographs and correspondence, range distances were 1,500 to 5,000 yards and the firing points likely used the Choccolocco Mountains as a backstop. Documented artillery and mortar use in this area takes place from 1912 to the beginning of World War II.

Soils at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X, consist mainly of one soil series. This soil series is the soils of the higher elevations of the Choccolocco Mountains consisting of the stony rough land sandstone series (U.S. Department of Agriculture, 1961). This miscellaneous land type consists of rough mountainous areas with many outcrops of sandstone and quartzite bedrock, loose rock fragments, and scattered patches of sandy soil material. It also includes rock escarpments on higher parts of the mountains where quartzite of the Weisner Formation is common. Slopes are generally more than 25 percent. The soil material is generally shallow over bedrock. Depth to bedrock is typically less than 3 feet. Depth to groundwater is usually more than 20 feet.

A small area of the northern portion of Parcel 138Q-X consists of the Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded (U.S. Department of Agriculture, 1961). The Jefferson series consists of well-drained, strongly acid soils that occur in small areas on fans and on foot slopes in the Choccolocco, Colvin, and Coldwater Mountains. These soils have developed from old local alluvium that washed or sloughed from ridges of sandstone, shale, and Weisner quartzite. The surface soil is dark grayish-brown fine sandy loam, and the subsoil is yellowish-brown, light fine sandy clay. Fragments of sandstone and quartzite as much as 8 inches in diameter are on the surface and throughout the profile.

The mapping unit, Jefferson stony fine sandy loam, 6 to 10 percent slopes, eroded, has strong slopes with high runoff. A few places are severely eroded and contain gullies. The solum ranges from 24 to 40 inches in thickness. Tilth is good and the root zone is thick. The stones range from 3 to 8 inches in diameter. A few small scattered areas have moderate erosion.

### **1.3 Scope of Work**

The scope of work for activities associated with the SI at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X, as specified by the statement of work (USACE, 1999b), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Develop the site-specific UXO safety plan attachment.
- Conduct a surface and near-surface unexploded ordnance survey for the purpose of UXO avoidance over all areas to be included in the sampling effort.
- Provide downhole UXO support for the purpose of UXO avoidance for all intrusive drilling to determine buried downhole hazards.
- Collect 14 surface soil samples, 14 subsurface soil samples, 2 seep water samples, 12 surface water samples, and 12 sediment samples to determine whether potential site-specific chemicals (PSSC) are present at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X, and to provide data useful for supporting any future planned corrective measures and closure activities.
- Samples will be analyzed for the parameters listed in Section 4.5.

The Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X fall within the “Possible Artillery Impact Areas” shown on Plate 10 of the FTMC ASR Maps, July, 1999; therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at these sites. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance. The site-specific UXO safety plan will be used to support hazardous, toxic, and radiological waste and construction activities at the work sites should incidental ordnance, explosives and UXO be encountered and require avoidance or disposal.

At completion of the field activities and sample analyses, draft and final SI summary reports will be prepared to summarize the results of the activities, to evaluate the absence or presence of PSSCs at these sites, and to recommend further actions, if appropriate. SI sampling reports will

be prepared in accordance with current U.S. Environmental Protection Agency (EPA), Region IV and the Alabama Department of Environmental Management (ADEM) guidelines.

## ***2.0 Summary of Existing Environmental Studies***

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An environmental baseline survey (EBS) was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense (DOD) guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria.

1. Areas where no storage, release, or disposal (including migration) has occurred
2. Areas where only release or disposal of petroleum products has occurred
3. Areas of contamination below action levels
4. Areas where all necessary remedial actions have been taken
5. Areas of known contamination with removal and/or remedial action underway
6. Areas of known contamination where required response actions have not been taken
7. Areas that are not evaluated or require further evaluation.

For non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number, the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified Parcel, and the code for the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

A	=	Asbestos (in buildings)
L	=	Lead-Based Paint (in buildings)
P	=	Polychlorinated biphenyls
R	=	Radon (in buildings)
RD	=	Radionuclides/Radiological Issues
X	=	UXO
CWM	=	Chemical Warfare Material.

The EBS was conducted in accordance with the CERFA (CERFA-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews

were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels. There were not any previous investigations conducted at these sites.

The Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X were identified as Category 1 CERFA sites, and were qualified “X” for UXO. These CERFA sites are parcels where no known or recorded storage, release, or disposal (including migration) has occurred on site property and are qualified for potential UXO. The Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X also require additional evaluation to determine the environmental condition of the parcels.

## **3.0 Site-Specific Data Quality Objectives**

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### **3.1 Overview**

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X. This section incorporates the components of the DQO process described in the publication EPA 540-R-93-071 *Data Quality Objectives Process for Superfund* (EPA, 1993). The DQO process as applied to the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X is described in more detail in Section 4.3 of the WP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples, and the procedures necessary to meet the objectives of the SI and establish a basis for any future action at these sites.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Chapter 4.0 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using Contract Laboratory Program (CLP)-like forms along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

### **3.2 Data Users and Available Data**

The available information summary, presented in Table 3-1, related to the SI at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X has been used to formulate a site-specific conceptual model. This conceptual model was developed to support the development of this SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the sites. The data users for the data and information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and the USACE supporting contractors. This SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to

Table 3-1

**Summary of Data Quality Objectives**  
**Site Investigation**  
**Artillery and Mortar Impact Areas South of Bains Gap Road,**  
**Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X**  
**Fort McClellan, Calhoun County, Alabama**

Potential Data Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation, other contractors, and possible future land users	None available	<u>Contaminant Source</u> Artillery and Mortar Impact Areas South of Bains Gap Road (munitions, explosives, ordnance)  <u>Migration Pathways</u> Infiltration and leaching to subsurface soil, biotransfer to deer through browsing, dust emissions to ambient air, and runoff and erosion to surface water and sediment  <u>Potential Receptors</u> Recreational site user (current and future) and resident (future)  <u>PSSC</u> lead, nitroexplosives, perchlorate	<u>Surface soil</u>	SI to confirm the presence or absence of contamination in the site media	<u>Surface soil</u> TAL Metals, Nitroexplosives, Perchlorate	Definitive data in CESAS Level B data packages	14 direct-push soil samples + QC
			<u>Subsurface Soil</u>				
			<u>Seep Water</u>	Definitive quality data for future decision- making			
			<u>Surface Water</u>		<u>Subsurface Soil</u> TAL Metals, Nitroexplosives, Perchlorate	Definitive data in CESAS Level B data packages	14 direct-push soil samples + QC
			<u>Sediment</u>				
					<u>Seep Water</u> TAL Metals, Nitroexplosives, Perchlorate	Definitive data in CESAS Level B data packages	2 seep water samples + QC
					<u>Surface Water</u> TAL Metals, Nitroexplosives, Perchlorate	Definitive data in CESAS Level B data packages	12 surface water samples + QC
					<u>Sediment</u> TAL Metals, Nitroexplosives, Perchlorate TOC, and Grain Size	Definitive data in CESAS Level B data packages	12 sediment samples + QC

ADEM - Alabama Department of Environmental Management.  
 CESAS - Corps of Engineers South Atlantic Savannah.  
 DOD - U.S. Department of Defense.  
 EPA - U.S. Environmental Protection Agency.  
 FTMC - Fort McClellan.  
 PSSC - Potential Site-Specific Chemical

QC - Quality control.  
 SI - Site investigation.  
 TAL - Target analyte list.  
 TOC - Total organic carbon.  
 USACE - U.S. Army Corps of Engineers.



provide the level of defensible data and information required to confirm or rule out the existence of residual chemical contamination in site media.

### **3.3 Conceptual Site Exposure Model**

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks and hazards to human health in the risk assessment. The CSEM includes receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates a consistent and comprehensive evaluation of risk to human health through graphically presenting all possible exposure pathways, including sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact scenarios with a contaminated source medium.

Primary contaminant releases were probably limited to leaching of material at ordnance impacts that entered surface soil. Potential contaminant transport pathways include infiltration and leaching to subsurface soil, biotransfer to deer, dust emissions to ambient air, surface water runoff, and erosion to surface water and sediment. Groundwater is not anticipated to be impacted due to the bedrock and large depth to groundwater (approximately 200 feet below ground surface [bgs]). It is also not anticipated to be used as a source of drinking water in the future, nor is it currently used.

Currently, the sites are restricted and are not utilized. The sites have an overgrowth of vegetation and are not fenced. There are a large number of open areas and wooded areas in and around the sites; therefore people may trespass at the sites and may hunt for deer. Other potential receptors considered, but not included under current land-use scenarios, are the following:

- **Groundskeeper.** The sites are not currently maintained by a groundskeeper.

- **Construction Worker.** The sites are unused and have no facilities, and no development or construction is occurring or scheduled.
- **Resident.** The sites are not currently used for residential purposes.

Future land use for the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X is shown as part of the Remediation Reserve and will likely be used for passive recreation and open space (FTMC, 1997). Because of the potential for UXO, the sites may not be deemed safe for public access until remediation has been completed (FTMC, 1997). Plausible future land-use receptor scenarios addressed in the CSEM include:

- **Resident.** The residential scenario is considered in order to provide information for the project manager and regulators.
- **Recreational Site User.** The sites are in areas planned for recreational use. Also, venison consumption is a potential exposure pathway for the recreational site user because deer hunting is likely in the remediation reserve.

Exposure pathways that are excluded from the CSEM include:

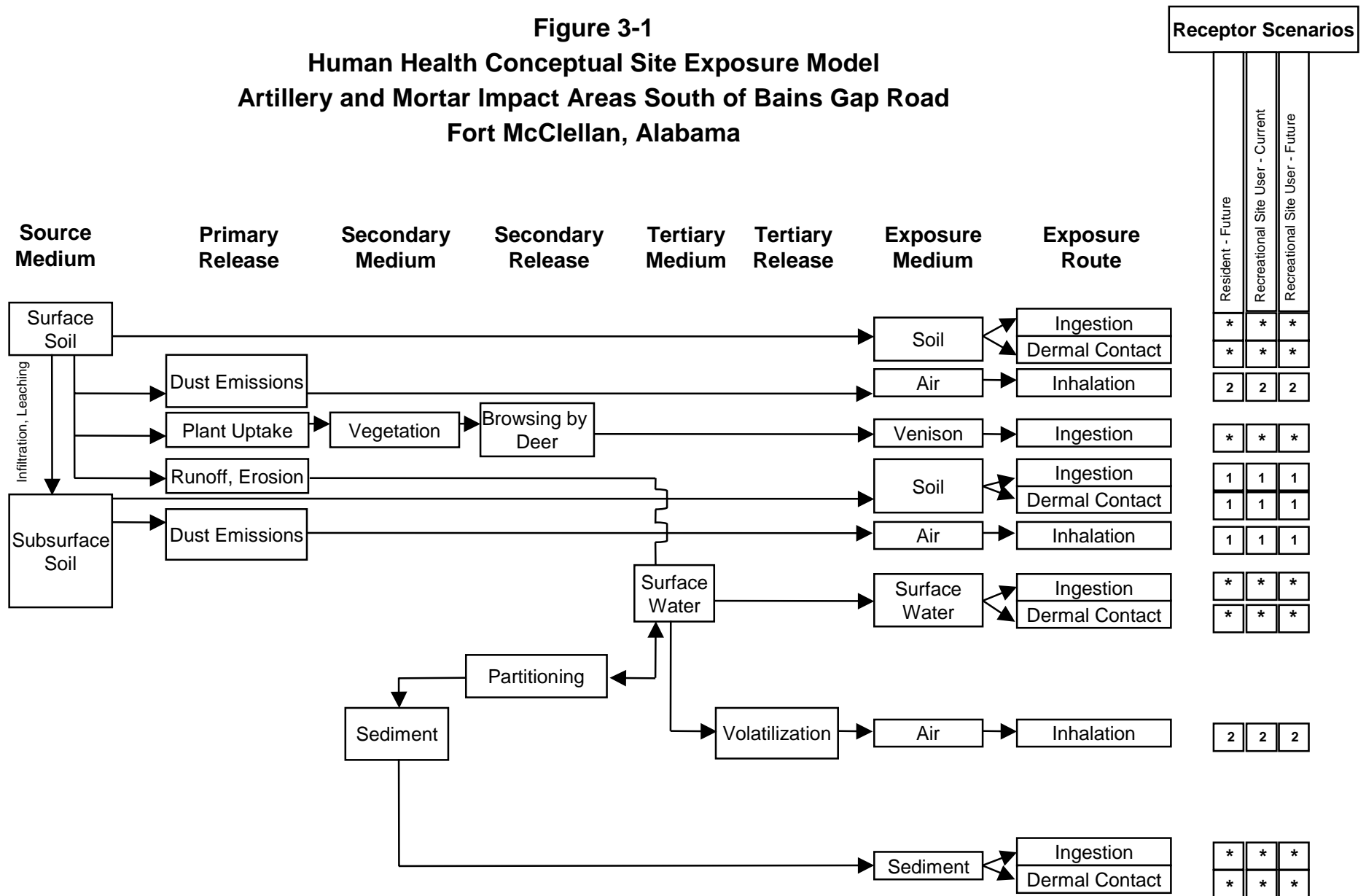
- **Construction Worker.** The construction worker scenario is not considered because there is not any construction scheduled for this area.
- **Groundskeeper.** The sites are in remote areas without maintained roads and the sites have no need to be maintained in the future.
- **Fish Consumption.** Fish consumption is not considered for the current or future recreational site user receptor scenario because the intermittent streams are not large enough to support fishing for consumption.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors and exposure pathways for the sites is provided in Table 3-1 and Figure 3-1.

### **3.4 Decision-Making Process, Data Uses, and Needs**

The decision-making process consists of a seven-step process that is presented in detail in Section 4.3 of the WP and will be followed during the SI at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X. Data uses and needs are summarized in Table 3-1.

**Figure 3-1**  
**Human Health Conceptual Site Exposure Model**  
**Artillery and Mortar Impact Areas South of Bains Gap Road**  
**Fort McClellan, Alabama**



\* = Complete exposure pathway evaluated in the streamlined risk assessment.

1 = Incomplete exposure pathway.

2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

### **3.4.1 Risk Evaluation**

Confirmation of contamination at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X will be based on comparing detected site chemicals of potential concern to site-specific screening levels developed in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). EPA definitive data with CESAS Level B data packages will be used to determine whether or not PSSCs are detected in site media. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

Assessment of potential ecological risk associated with sites or parcels (e.g., surface water and sediment sampling, specific ecological assessment methods, etc.) will be addressed in accordance with the procedures in the WP.

### **3.4.2 Data Types and Quality**

Surface soil, subsurface soil, seep water, surface water, and sediment samples will be sampled and analyzed to meet the objectives of the SI at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X. Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 methods update III, where available; comply with EPA definitive data requirements; and be reported using hard copy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

### **3.4.3 Precision, Accuracy, and Completeness**

Laboratory requirements of precision, accuracy, and completeness for this SI are provided in Section 9.0 of the QAP.

## **4.0 Field Activities**

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### **4.1 UXO Survey Requirements and Utility Clearances**

Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X fall within the “Possible Artillery Impact Areas” shown on Plate 10 of the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (USACE, 1999a); therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at these impact areas. Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings. The site-specific UXO safety plan provides technical guidance for ordnance and explosives avoidance and construction activities for sample collection activities at the Artillery and Mortar Impact Areas South of Bains Gap Road. The site-specific UXO safety plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2000b).

#### **4.1.1 Surface UXO Survey**

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for each avoidance. Subsurface metallic anomalies will not be disturbed, and will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in the site-specific UXO safety plan and Chapter 4.0 and Appendix E of the approved SAP (IT, 2000a).

#### **4.1.2 Downhole UXO Survey**

During the soil boring and downhole sampling, downhole UXO surveys will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Chapter 4.0 of the SAP (IT, 2000a), will continue until undisturbed soils are encountered or the borehole has been advanced to 12 feet bgs, whichever is reached first.

#### **4.1.3 Utility Clearances**

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP (IT, 2000a). The site manager will mark the proposed locations with stakes, coordinate with the local utility

companies to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

## **4.2 Environmental Sampling**

The environmental sampling program at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X includes the collection of surface soil, subsurface soil, seep water, surface water, and sediment samples for chemical analyses. These samples will be collected and analyzed to provide data for characterizing the sites to determine the environmental condition of the sites and any further action to be conducted at the sites. Additionally, samples will be collected from environmental media in locations that will assist in the assessment of potential ecological impacts resulting from activities at the sites.

### **4.2.1 Surface Soil Sampling**

Surface soil samples will be collected from 14 locations at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X.

#### **4.2.1.1 Sample Locations and Rationale**

The surface soil sampling rationale are listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and required QA/QC sample requirements are summarized in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field conditions.

#### **4.2.1.2 Sample Collection**

Surface soil samples will be collected from the upper 1 foot of soil by direct-push methodology as specified in Section 4.7.1.1 of the SAP (IT, 2000a). Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 4.15 of the SAP. Surface soil samples will be screened for information purposes only, and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

Table 4-1

**Sampling Locations and Rationale**  
**Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X**  
**Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
138Q-X	HR-138Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the upgradient southern section of Parcel 138Q-X. Sample data will indicate if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-138Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the downgradient northeastern section of Parcel 138Q-X. Sample data will indicate if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-138Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the central western area of Parcel 138Q(7). Sample data will indicate if contaminant releases into the environment have occurred in this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-138Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the downgradient northern area of Parcel 138Q(7). Sample data will indicate if contaminant releases into the environment have occurred in this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-138Q-SW/SD01	Surface water and sediment	Sample location is downgradient of Parcel 140Q-X and upstream of Parcel 138Q-X on an intermittent stream that flows northeast along the eastern border of the parcel. The sample location is prior to the convergence with the stream from Parcel 141Q-X. Sample data will indicate if contaminant releases have occurred from runoff from the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-138Q-SW/SD02	Surface water and sediment	Sample location is east of the central area of Parcel 138Q-X on an intermittent stream that flows north along the eastern border of the parcel. The sample location is prior to the convergence with the stream from the east side of Parcel 140Q-X. Sample data will indicate if contaminant releases have occurred from runoff from the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-138Q-SW/SD03	Surface water and sediment	Sample location is the northern tip of Parcel 138Q-X downstream of the parcel on an intermittent stream that flows northwest from the parcel. Sample data will indicate if contaminant releases have occurred from runoff from the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-138Q-SW/SD04	Surface water and sediment	Sample location is north of the central area of Parcel 138Q-X on an intermittent stream that flows northwest along the northeastern border of the parcel. Sample data will indicate if contaminant releases have occurred from runoff from the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-138Q-SW/SD05	Surface water and sediment	Sample location is northwest of the central area of Parcel 138Q-X on an intermittent stream that flows northwest from the parcel. Sample data will indicate if contaminant releases have occurred from runoff from the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-138Q-SEEP01	Seep water	Sample location is at the northwestern tip of Parcel 138Q-X and downgradient of the parcel in a seep area. Sample data will indicate if contaminant releases have occurred from runoff from the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the seep and other ecological receptors that may utilize that seep for food and/or habitat purposes.
	HR-138Q-SEEP02	Seep water	Sample location is east of Parcel 138Q-X and downgradient of the parcel in a seep area. Sample data will indicate if contaminant releases have occurred from runoff from the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the seep and other ecological receptors that may utilize that seep for food and/or habitat purposes.
139Q-X	HR-139Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the upgradient southern section of Parcel 139Q-X. Sample data will indicate if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-139Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the southern downgradient area of Parcel 139Q(7). Sample data will indicate if contaminant releases into the environment have occurred in this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-139Q-SW/SD01	Surface water and sediment	Sample location is just northeast of Parcel 139Q-X and downstream of the parcel on an intermittent stream that flows north along the eastern border of the parcel. Sample data will indicate if contaminant releases have occurred from runoff from the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.

Table 4-1

**Sampling Locations and Rationale**  
**Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X**  
**Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
<b>140Q-X</b>	HR-140Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the upgradient southern section of Parcel 140Q-X. Sample data will indicate if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-140Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the southern section of the site, downgradient of the parcel. Sample data will indicate if contaminant releases into the environment have occurred in this area and if contaminated soil exists at this site. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-140Q-SW/SD01	Surface water and sediment	Sample location is north and downgradient of Parcel 140Q-X in the intermittent stream that flows north away from the parcel. Sample data will indicate if contaminant releases have occurred from runoff from activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
<b>141Q-X</b>	HR-141Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the upgradient southern section of Parcel 141Q-X. Sample data will indicate if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-141Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the center section of Parcel 141Q-X. Sample data will indicate if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-141Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the eastern center section of Parcel 141Q-X. Sample data will indicate if contaminant releases into the environment have occurred in this impact area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-141Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the northern downgradient section of Parcel 141Q-X. Sample data will indicate if contaminant releases into the environment have occurred in this impact area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and
	HR-141Q-SW/SD01	Surface water and sediment	Sample location is southeast of Parcel 141Q-X in the intermittent stream that flows north through the eastern side of the parcel. Sample data will indicate if contaminant releases have occurred from runoff from activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-141Q-SW/SD02	Surface water and sediment	Sample location is east of Parcel 141Q-X in the intermittent stream that flows northeast from the eastern side of the parcel. Sample data will indicate if contaminant releases have occurred from runoff from activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-141Q-SW/SD03	Surface water and sediment	Sample location is north of Parcel 141Q-X in the intermittent stream that flows northwest away from the parcel. Sample data will indicate if contaminant releases have occurred from runoff from activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
<b>142Q-X</b>	HR-142Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the upgradient southern section of Parcel 142Q-X. Sample data will indicate if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-142Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the northern section of Parcel 142Q-X. Sample data will indicate if contaminant releases into the environment have occurred in this impact area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-142Q-SW/SD01	Surface water and sediment	Sample location is north of Parcel 142Q-X in the intermittent stream that flows northwest away from the parcel. Sample data will indicate if contaminant releases have occurred from runoff from activities at the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
	HR-142Q-SW/SD02	Surface water and sediment	Sample location is south of Parcel 142Q-X in the intermittent stream that flows north into the parcel. Sample data will indicate if contaminant releases have occurred from runoff from activities upgradient of the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.



Table 4-2

**Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities**  
**Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X**  
**Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-138Q-GP01	HR-138Q-GP01-SS-YE0001-REG	0-1			HR-138Q-GP01-SS-YE0001-MS/MSD	TAL Metals, Nitroexplosives, Perchlorate
	HR-138Q-GP01-DS-YE0002-REG	a	HR-138Q-GP01-DS-YE0003-FD	HR-138Q-GP01-DS-YE0004-FS		
HR-138Q-GP02	HR-138Q-GP02-SS-YE0005-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-138Q-GP02-DS-YE0006-REG	a				
HR-138Q-GP03	HR-138Q-GP03-SS-YE0007-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-138Q-GP03-DS-YE0008-REG	a				
HR-138Q-GP04	HR-138Q-GP04-SS-YE0009-REG	0-1			HR-138Q-GP04-SS-YE0009-MS/MSD	TAL Metals, Nitroexplosives, Perchlorate
	HR-138Q-GP04-DS-YE0010-REG	a				
HR-139Q-GP01	HR-139Q-GP01-SS-YG0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-139Q-GP01-DS-YG0002-REG	a				
HR-139Q-GP02	HR-139Q-GP02-SS-YG0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-139Q-GP02-DS-YG0004-REG	a	HR-139Q-GP02-DS-YG0005-FD	HR-139Q-GP02-DS-YG0006-FS		
HR-140Q-GP01	HR-140Q-GP01-SS-YH0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-140Q-GP01-DS-YH0002-REG	a				
HR-140Q-GP02	HR-140Q-GP02-SS-YH0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-140Q-GP02-DS-YH0004-REG	a	HR-140Q-GP02-DS-YH0005-FD			
HR-141Q-GP01	HR-141Q-GP01-SS-YJ0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-141Q-GP01-DS-YJ0002-REG	a				
HR-141Q-GP02	HR-141Q-GP02-SS-YJ0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-141Q-GP02-DS-YJ0004-REG	a				
HR-141Q-GP03	HR-141Q-GP03-SS-YJ0005-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-141Q-GP03-DS-YJ0006-REG	a				
HR-141Q-GP04	HR-141Q-GP04-SS-YJ0007-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-141Q-GP04-DS-YJ0008-REG	a				

**Table 4-2**

**Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities  
Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X  
Fort McClellan, Calhoun County, Alabama**

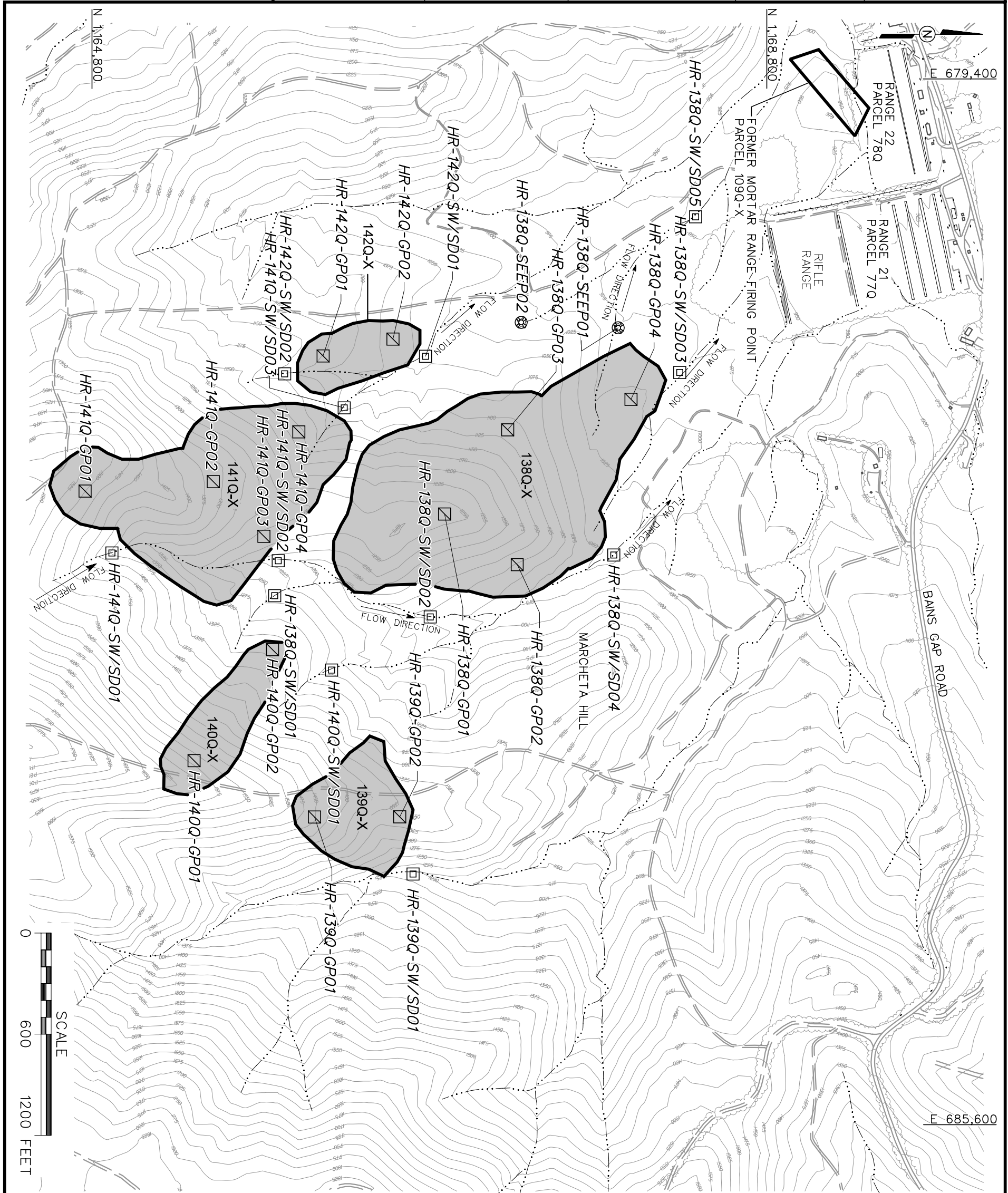
(Page 2 of 2)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-142Q-GP01	HR-142Q-GP01-SS-YL0001-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-142Q-GP01-DS-YL0002-REG	a				
HR-142Q-GP02	HR-142Q-GP02-SS-YL0003-REG	0-1				TAL Metals, Nitroexplosives, Perchlorate
	HR-142Q-GP02-DS-YL0004-REG	a				

<sup>a</sup> Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

REG - Field sample.  
FD - Field duplicate.  
FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.  
QA/QC - Quality assurance/quality control.  
TAL - Target analyte list.



## LEGEND














- |   |   |
|---|---|
|  | UNIMPROVED ROADS AND PARKING                            |
|  | PAVED ROADS AND PARKING                                 |
|  | BUILDING  |
|  | TOPOGRAPHIC CONTOURS<br>(CONTOUR INTERVAL - 25 FOOT)    |
|  | TREES / TREELINE  |
|  | PARCEL BOUNDARY   |
|  | BRIDGE  |
|  | CULVERT WITH HEADWALL                                   |
|  | SURFACE DRAINAGE / CREEK                                |
|  | UTILITY POLE  |
|  | PROPOSED SURFACE AND SUBSURFACE<br>SOIL SAMPLE LOCATION |
|  | PROPOSED SURFACE WATER/SEDIMENT<br>SAMPLE LOCATION      |
|  | PROPOSED SEEP WATER SAMPLE<br>LOCATION                  |

FIGURE 4-1  
PROPOSED SAMPLE LOCATIONS  
ARTILLERY AND MORTAR IMPACT  
AREAS SOUTH OF BANS GAP ROAD  
PARCELS 138Q-X, 139Q-X, 140Q-X,  
141Q-X, AND 142Q-X

U. S. ARMY CORPS OF ENGINEERS  
MOBILE DISTRICT  
FORT MCCELLELLAN  
CALHOUN COUNTY, ALABAMA  
Contract No. DACA21-96-D-0018



## **4.2.2 Subsurface Soil Sampling**

Subsurface soil samples will be collected from 14 borings installed at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X.

### **4.2.2.1 Sample Locations and Rationale**

Subsurface soil samples will be collected from the soil borings proposed on Figure 4-1. The subsurface soil sampling rationale is listed in Table 4-1. Subsurface soil samples to be collected are listed in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field observations and utility clearance results.

### **4.2.2.2 Sample Collection**

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot bgs in the unsaturated zone. The soil borings will be advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.7.1.1 of the SAP (IT, 2000a).

Soil samples will be collected continuously for the first 12 feet or until either groundwater or refusal is reached. A detailed lithological log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analyses. The collected subsurface soil samples will be field-screened using a PID in accordance with Section 4.15 of the SAP to measure samples exhibiting elevated readings exceeding background (readings in ambient air). Typically, the subsurface soil sample showing the highest reading (above background) will be selected and sent to the laboratory for analysis. If none of the samples indicate readings exceeding background using the PID, the deepest interval from the soil boring will be sampled and submitted to the laboratory for analyses. Subsurface soil samples will be selected for analyses from any depth interval if the on-site geologist suspects PSSCs at the interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analyses. More than one subsurface soil sample will be collected if field measurements and observations indicate a possible layer of PSSCs and/or additional sample data would provide insight to the existence of any PSSCs.

Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

### **4.2.3 Seep Water Sampling**

Seep water samples will be collected from two locations northeast of Parcel 138Q-X as shown on Figure 4-1.

#### **4.2.3.1 Sample Locations and Rationale**

The seep water sampling rationale are listed in Table 4-1. The seep water samples will be collected from the proposed locations on Figure 4-1. The seep water sample designations and required QA/QC sample requirements are listed in Table 4-3. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

#### **4.2.3.2 Sample Collection**

A vacuum syringe sampling device will be used to extract the water from inside the seep and transfer the water sample to the sample container. A plastic irrigation syringe (60 to 500 cubic centimeters) will be connected to a length of flexible Teflon<sup>™</sup>-lined tubing and looped several times to allow all the extracted water sample to collect in the Teflon tubing and not enter the syringe. The open end of the tubing and the vacuum syringe may be attached to a plastic probe or rod to give the tubing rigidity when inserting the tubing into the seep to extract the sample.

The open end of the tubing is inserted into the source of the seep as far as possible to collect the seep water. A vacuum is pulled with the syringe on the tubing to draw up the seep water. When extracting the water sample, avoid inserting the open end of the tubing into soil, silt, debris, etc. to collect a clean sample. After the tubing has filled, the open end of the tubing is transferred to the sample container and the syringe is compressed slowly to expel the water sample into the sample container. The above steps are repeated until the sample containers are filled.

The syringe and sampling tube device will be decontaminated before each sample is collected. A new length of tubing will be used before each sample is collected to minimize cross contamination between sample collection operations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP (IT, 2000a).

During each seep water sample collection, field measurements will be collected for conductivity, pH, oxidation-reduction potential, temperature, turbidity and dissolved oxygen as specified in

Table 4-3

**Surface Water, Sediment, and Seep Water Sample Designations and QA/QC Sample Quantities**  
**Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X**  
**Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
HR-138Q-SW/SD01	HR-138Q-SW/SD01-SW-YE2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-138Q-SW/SD01-SD-YE1001-REG	Sediment	0-0.5	HR-138Q-SW/SD01-SD-YE1002-FD			
HR-138Q-SW/SD02	HR-138Q-SW/SD02-SW-YE2002-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-138Q-SW/SD02-SD-YE1003-REG	Sediment	0-0.5				
HR-138Q-SW/SD03	HR-138Q-SW/SD03-SW-YE2003-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-138Q-SW/SD03-SD-YE1004-REG	Sediment	0-0.5				
HR-138Q-SW/SD04	HR-138Q-SW/SD04-SW-YE2004-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-138Q-SW/SD04-SD-YE1005-REG	Sediment	0-0.5				
HR-138Q-SW/SD05	HR-138Q-SW/SD05-SW-YE2005-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-138Q-SW/SD05-SD-YE1006-REG	Sediment	0-0.5				
HR-138Q-SEEP01	HR-138Q-SEEP01-SEP-YE2005-REG	Seep Water	N/A				TAL Metals, Nitroexplosives, Perchlorate
HR-138Q-SEEP02	HR-138Q-SEEP02-SEP-YE2006-REG	Seep Water	N/A				TAL Metals, Nitroexplosives, Perchlorate
HR-139Q-SW/SD01	HR-139Q-SW/SD01-SW-YG2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-139Q-SW/SD01-SD-YG1001-REG	Sediment	0-0.5				
HR-140Q-SW/SD01	HR-140Q-SW/SD01-SW-YH2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-140Q-SW/SD01-SD-YH1001-REG	Sediment	0-0.5				
HR-141Q-SW/SD01	HR-141Q-SW/SD01-SW-YJ2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-141Q-SW/SD01-SD-YJ1001-REG	Sediment	0-0.5				
HR-141Q-SW/SD02	HR-141Q-SW/SD02-SW-YJ2002-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-141Q-SW/SD02-SD-YJ1002-REG	Sediment	0-0.5				
HR-141Q-SW/SD03	HR-141Q-SW/SD03-SW-YJ2003-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-141Q-SW/SD03-SD-YJ1003-REG	Sediment	0-0.5				
HR-142Q-SW/SD01	HR-142Q-SW/SD01-SW-YL2001-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-142Q-SW/SD01-SD-YL1001-REG	Sediment	0-0.5				
HR-142Q-SW/SD02	HR-142Q-SW/SD02-SW-YL2002-REG	Surface Water	N/A				TAL Metals, Nitroexplosives, Perchlorate TOC, Grain Size (sediment only)
	HR-142Q-SW/SD02-SD-YL1002-REG	Sediment	0-0.5				

MS/MSD - Matrix spike/matrix spike duplicate.

NA - Not applicable.

QA/QC - Quality assurance/quality control.

REG - Field sample.

TAL - Target analyte list.

TOC - Total organic carbon.

Section 4.9.13 for surface water sampling. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

#### **4.2.4 Surface Water Sampling**

Twelve surface water samples will be collected from intermittent streams/creeks in the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X.

##### **4.2.4.1 Sample Locations and Rationale**

The surface water sampling rationale are listed in Table 4-1. The surface water samples will be collected from the proposed locations on Figure 4-1. The surface water sample designations and required QA/QC sample requirements are listed in Table 4-3. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

##### **4.2.4.2 Sample Collection**

The surface water samples will be collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

#### **4.2.5 Sediment Sampling**

Twelve sediment samples will be collected from the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X. These sediment samples will be collected at the same locations as the surface water samples described in Section 4.2.5.

##### **4.2.5.1 Sample Locations and Rationale**

The proposed locations for the sediment samples are shown in Figure 4-1. Sediment sampling rationale is presented in Table 4-1. The sediment sample designation and required QA/QC sample requirements are listed in Table 4-3. The actual sediment sample points will be at the

discretion of the ecological sampler based on the drainage pathways and actual field observations.

#### **4.2.5.2 Sample Collection**

The sediment samples will be collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. The sediment samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

#### **4.3 Decontamination Requirements**

Decontamination will be performed on sampling and nonsampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP (IT, 2000a). Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

#### **4.4 Surveying of Sample Locations**

Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama Southeast Zone, North American Datum, 1983. Elevations will be referenced to the National Geodetic Vertical Datum of 1929 or the North American Vertical Datum of 1988 (soon to be established on site).

Horizontal coordinates for soil, sediment, and surface water locations will be recorded using a GPS to provide accuracy within 1 meter. Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP. All areas must be cleared for UXO avoidance before any surveying activities will commence.

#### **4.5 Analytical Program**

Samples collected at locations specified in this chapter of this SFSP will be analyzed for the specific suites of chemicals and elements based on the history of site usage, as well as EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected from the



Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X, consist of the following list of analytical suites:

- Target Analyte List Metals – Method 6010B/7000
- Nitroexplosives – Method 8330
- Perchlorate – EPA Method 314.

In addition, the sediment samples will be analyzed for the following list of parameters:

- Total Organic Carbon – Method 9060
- Grain Size – ASTM D-421/D-422.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-4 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP).

Chemical data will be reported via hard copy data packages by the laboratory using CLP-like forms along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

#### ***4.6 Sample Preservation, Packaging, and Shipping***

Sample preservation, packaging, and shipping will follow the procedures specified in Section 4.13.2 of the SAP (IT, 2000a). Completed analysis request/COC records will be secured and included with each shipment of coolers to:

Attn: Elizabeth McIntyre  
EMAX Laboratories, Inc.  
630 Maple Avenue  
Torrance, California 90503  
Telephone: (310) 618-8889.

Table 4-4

**Analytical Samples**  
**Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X**  
**Fort McClellan, Calhoun County, Alabama**

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples <sup>(a)</sup>					EMAX	QA Lab
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	Splits w/ QA Lab (5%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	Total No. Analysis	Total No. Analysis
Artillery and Mortar Impact Areas South of Bains Gap Road: 14 water matrix samples (2 seep water samples and 12 surface water samples); 40 soil matrix samples (14 surface soil samples, 14 subsurface soil samples, 12 sediment samples )													
Tot TAL Metals	6010B/7000	water	normal	14	1	14	2	1	1		1	19	1
Nitroexplosives	8330	water	normal	14	1	14	2	1	1		1	19	1
Perchlorate	314	water	normal	14	1	14	2	1	1		1	19	1
TAL Metals	6010B/7000	soil	normal	40	1	40	4	2	2		1	49	2
Nitroexplosives	8330	soil	normal	40	1	40	4	2	2		1	49	2
Perchlorate	314	soil	normal	40	1	40	4	2	2		1	49	2
TOC	9060	sediment	normal	12	1	12						12	0
Grain Size	ASTM D-421/D-422	sediment	normal	12	1	12						12	0
Artillery and Mortar Impact Areas South of Bains Gap Road:						186	18	9	9	0	6	228	9

<sup>a</sup>Field duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number. Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to:

EMAX Laboratories, Inc.  
630 Maple Avenue  
Torrance California  
Attn: Elizabeth McIntyre  
Tel: 310-618-8889  
Fax: 310-618-0818

USACE Laboratory split samples  
are shipped to:

U.S. Army Engineer District, Savannah  
Environmental & Materials District  
Attn: Sample Receiving  
200 North Cobb Parkway  
Building 400, Suite 404  
Marietta, Georgia 30062  
Tel: 678-354-0310

MS/MSD - Matrix spike/matrix spike duplicate.

PCB - Polychlorinated biphenyl.

QA/QC - Quality assurance/quality control.

TCL - Target compound list.

TOC - Total organic carbon.

QA split samples collected for the USACE laboratory will be shipped to the following address:

U.S. Army Engineer District, Savannah  
Environmental & Materials Unit  
Attn: Sample Receiving  
200 North Cobb Parkway  
Building 400, Suite 404  
Marietta, Georgia 30062  
Telephone: (678) 354-0310.

#### ***4.7 Investigation-Derived Waste Management***

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000a). The IDW generated at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X is expected to include decontamination fluids and disposable personal protective equipment. The IDW will be staged in the fenced area surrounding Buildings 335 and 336 while awaiting final disposal.

#### ***4.8 Site-Specific Safety and Health***

Health and safety requirements for this SI are provided in the SSHP attachment for the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X. The SSHP attachment will be used in conjunction with the installation-wide SHP.

## ***5.0 Project Schedule***

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The project schedule for the SI activities will be provided by the IT project manager to the Base Realignment and Closure Cleanup Team and will be in accordance with the WP.

## 6.0 References

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Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

Fort McClellan (FTMC), 1997, ***Fort McClellan Comprehensive Reuse Plan***, Fort McClellan Reuse and Redevelopment Authority of Alabama, prepared under contract to the Calhoun County Commission, November.

IT Corporation (IT), 2000a, ***Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, August.

IT Corporation (IT), 2000b, ***Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama***, July.

IT Corporation (IT), 1998, ***Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama***, August.

U.S. Army Corps of Engineers (USACE), 1999a, ***Archives Search Report, Maps, Fort McClellan, Anniston, Alabama***, July.

U.S. Army Corps of Engineers (USACE), 1999b, ***Statement of Work for Task Order CK10, Remedial Investigations(RIs) at the Chemical Warfare Material Sites, RIs at the Fuel/Training Areas, RIs at the Print Plants/Motor Pools, RIs at the Ground Scars/Boiler Plants, RI at Range 24A, Site investigations (SIs) at the Historic Ranges, and a Groundwater Investigation at Rideout Field at Fort McClellan, Alabama***, June.

U.S. Army Corps of Engineers (USACE), 1994, ***Requirements for the Preparation of Sampling and Analysis Plan***, Engineer Manual EM 200-1-3, September 1.

U.S. Department of Agriculture (USDA), 1961, ***Soil Survey, Calhoun County, Alabama***, Soil Conservation Service, Series 1958, No. 9, September.

U.S. Environmental Protection Agency (EPA), 1993, ***Data Quality Objectives Process for Superfund, Interim Final Guidance***, EPA 540-R-93-071, September.

**ATTACHMENT 1**

**LIST OF ABBREVIATIONS AND ACRONYMS**